

## Web 3.0

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### ABSTRACT

Web 3.0, or web3, is the vision for the third generation of the internet (the world wide web) which is based on decentralization, blockchain, other modern technologies, and token-based economics. The use of web3 is to make the internet more open, secure, efficient, transparent, creating a more immersive and personalized web experience. Web 3.0, also known as the “Internet of Value” gives users more control over their data and offering more autonomy by removing intermediaries and creating an environment based on the principles of transparency, security and privacy. The paper looks into the concepts, pros, cons, benefits, and the challenges cum solutions to web 3.0, as well as its future prospect.

**KEYWORDS:** Blockchain, machine learning (ML), decentralization, consensus, cryptography, Edge Computing, artificial intelligence (AI), non-fungible tokens (NFTs), metaverse, World Wide Web (WWW), cybersecurity, robotics, Internet of Things (IoT), Industrial Internet of Things (IIoT), asset tokenization

### INTRODUCTION

Web 3.0, which is also known as Web3 [1, 2], was an idea for a new iteration of the World Wide Web which is said to incorporate concepts like decentralization, blockchain technologies, and token-based economics [3]. Web 3.0 as the third generation of the World Wide Web is to bring about openness, decentralization, greater security, efficiency and transparency, and with more immersive and personalized web experience [4]. Web 3.0 gives users more control over their data and offering more autonomy by removing intermediaries and creating an environment based on the principles of transparency, security and privacy [5]. While often used interchangeably, “Web3” and Web 3.0” represent distinct concepts as: Web3 focuses on decentralized, blockchain-based internet emphasizing user control and ownership, as shown in Figure 1, but while Web 3.0, or the Semantic Web, as shown in Figures 2 and 3, aims for a more intelligent, interconnected web through technologies like AI and machine learning [6].

### HISTORICAL BACKGROUND

Web2, which is also known as the “social internet,” was characterized by the centralization of power in

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the hands of large platforms like Facebook, Twitter, Amazon, Apple, Alphabet, as shown in Figure 4, where users were dependent on these companies, leading to privacy restrictions, censorship and the lack of control over their data [5]. Web 3.0 with the concepts of decentralization, blockchain technologies, and token-based economics is quite distinct from Tim Berners-Lee’s concept of the Semantic Web, as shown in Figure 5, when contrasted with Web2, some journalists and technologists claimed user-generated content was controlled by a small group of companies referred to as Big Tech [7, 8], as shown in Figure 6. The term “web3” was coined in 2014 by Polkadot founder and Ethereum co-founder Gavin Wood – referring to a “decentralized online ecosystem based on blockchain” [1], as shown in Figure 7, and the idea gained interest in 2021 from cryptocurrency enthusiasts, large technology companies, and venture capital firms [7, 9]. The web3 concepts were first represented in 2013 [8, 10].

A few critics have expressed concerns over the centralization of wealth to a small group of investors and individuals [11], or a loss of privacy due to more expansive data collection [12]. Billionaires like Elon

Musk and Jack Dorsey have argued that web3 only serves as a buzzword or marketing term [13, 14].

Web 1.0 and Web 2.0 are eras in the history of the World Wide Web as it evolved through various technologies and formats, as shown in Figures 8 and 9. Web 1.0 is the period from 1991 to 2004, where most of the sites consisted of static pages, and the vast majority of users were consumers, not producers of content [15, 16]. Web 2.0 is based around the idea of “the web as platform” [17] and centers on user-created content uploaded to forums, social media and networking services, blogs, and wikis, etc. [18], which begun around 2004 and continues till today [17, 19, 7], as shown in Figure 10.

### WORKING OF WEB 3.0

Web 3.0 makes use of artificial intelligence (AI) and Machine Learning (ML) to generate faster and more reliable or relevant results. The technologies used in web 3.0 give people greater control over their data, transactions, and online assets.

### SOME KEY FEATURES OF WEB 3.0

Some concepts help to define web 3.0 and set it apart from the web we know today, some of which are [4]:

- Decentralization
- Ubiquitous connectivity
- Semantic networks
- Artificial intelligence
- Blockchain technologies
- 3D experiences

### SOME ADVANTAGES OF WEB 3.0

Some of the advantages or benefits of web 3.0 are [4]:

- The creation of a personalized user experience
- Enhances data security
- Increases transparency
- Reduces intermediaries
- Improves marketing efforts

Preparing for web 3.0: As we are moving closer to web 3.0 becoming a reality, with more capital being allocated to this space and the ecosystem it is rapidly growing and expanding. Hence, the need for people to be ready and prepared for the coming changes.

**Edge Computing:** Investing in Edge Computing is a catalyst and enabler of web 3.0, since it provides the supporting infrastructure to enable quick and reliable blockchain transactions. Edge computing means moving computing capacity closer to data sources. This will therefore enable faster processing and lower latency.

**Automation:** Decentralization will make keeping track of operations and processes more difficult, but this can be overcome by automation, which ensures that recurrent and everyday processes continue and

nothing is overlooked. The adoption of a hyper-automation or intelligent automation strategy can help keep processes running smoothly as the world shifts toward web 3.0 [4].

**Cybersecurity:** Security risks come with web 3.0 just as with any new technology. For this reason, cybersecurity will play a vital role for businesses in web 3.0, since the way data is stored and accessed is going to change. As a result of this, new approaches to cybersecurity will be needed, most especially for those businesses and industries handling high-value or sensitive information [4].

**Cryptocurrency:** Some of the web 3.0 protocols will likely rely on the use of digital tokens and digital means of exchange. It is therefore smart to stay informed on crypto developments.

**Promote web access:** Web 3.0 will promote ubiquitous connectivity, which means that anyone at anytime and anywhere can connect to and access the web. Promoting accessibility helps get you and your team ready for the development of web 3.0, supporting a digital workplace, and by providing secure and easy access. A digital transformation consulting agency can help to ensure your workers and customers have easy and secure access to software and solutions [4].

**Future of web 3.0:** The continued development of web 3.0 for certain will bring changes to how several sectors operate online, including banking, big tech, marketing and e-commerce. Therefore, with improved marketing opportunities and enhanced customer experiences, early adopters of web 3.0 will stand out from the crowd [4]. Moreover, the future of web3 applications as projected for 2024 are: decentralized finance (DeFi), X-to-Earn applications, Web3 social networks, modular blockchains, zero-disclosure technology (zkp), and metaverse [4]. The total market size of Web 3.0, including blockchain, NFTs, the metaverse, and other technologies, is expected to reach 81.5 billion dollars in 2030 [4].

**Web 3.0 applications:** The best Web 3.0 application products are [19]:

- ChainGPT – this can be used to help debug, analyze, and optimize smart contracts, ensuring that they are secure and efficient, as shown in Figure 11.
- StarkDeFi – the aim is to make decentralized finance (DeFi) more accessible and user-friendly for the next generation of users. This is by providing a variety of DeFi solutions in one place, including automated market makers (AMMs), synergy pools, farms, liquidity lockers, staking, minting, and launchpads.

- Magic Square – this is a place where users can find the best apps and games, learn about the latest developments in the space, and earn rewards for their participation.
- MoonPay – This serves as a bridge between the traditional financial system and the crypto economy. It allows users to buy cryptocurrencies with their fiat currency (e. g. USD, EUR, GBP) and sell cryptocurrencies for fiat currency. It also supports a wide range of payment methods, including credit cards, debit cards, bank transfers, and Apple Pay.
- Sleepagotchi – This is a web3 example of a gamified sleep tracker that rewards users for getting a good night's sleep with free NFTs and crypto tokens. Users can earn one free NFT every morning and two free NFTs if they meet their sleep goals.

*The new blockchain revolution:* The new blockchain revolution that is imminent is the advancing AI and “vibe coding” technology, according to Dominic Williams the founder and Chief Scientist at DFINITY. As at today, several hundreds of millions of people own bitcoin and other tokens hosted on blockchains worth trillions of dollars. Blockchains can host far more than tokens, they are even our future tech stack, which can host sophisticated Web apps too, and live fully-onchain, just like tokens. These apps are implemented entirely from network-resident code (i. e. smart contract software and its evolutions). The vibe coding is said to involve software engineers using tools with integrated AI that can write and fix software code on their behalf, making them much more productive.

Apps living on blockchains have the following valuable features: 1. They are sovereign and censorship-resistant because they live on a public network, 2. They are tamperproof – that is they are secure without depending on cybersecurity, 3. They are incredibly resilient, 4. They can seamlessly integrate powerful web3 functionalities, and 5. It can solve major problems involved with having AI build solo on traditional IT [21].

*Web 3.0 and robotics:* Web 3.0 empowers robotics and RPA with decentralized security, smart contracts, token economies, and DAOs, allowing these systems to operate more autonomously, securely, and collaboratively. These advancements unlock the opportunities for transparent and efficient operations, asset ownership flexibility, and new business models driven by blockchain and decentralized technologies. Web3 technologies are playing important role in robotics and robotic process automation (RPA),

creating new opportunities for innovation and efficiency via [22]:

Decentralized control and coordination approaches by:

1. Swarm robotics
2. Autonomous decision-making
3. Blockchain for data security
4. Collaborative networks

Enabling real-time auditing and compliance by way of:

1. Immutable compliance records
2. Automated reporting via RPA

Enhanced security and data integrity via:

1. Secure data exchange
2. Audit trails

AI and Machine Learning Integration for:

1. Adaptive learning
2. Generative AI in robotics

Tokenization and Incentivization for:

1. Robot-as-a-service (RaaS)
2. Incentivizing development
3. Rewards for data contribution
4. Crowdsourcing and microtransactions

Smart contracts for automated processes and agreements through:

1. Autonomous Process Execution
2. Standardized service agreements

Interoperability and standardization through:

1. Common protocols
2. Cross-platform integration

Improved supply chain transparency and security via:

1. Decentralized supply chain verification
2. RPA in blockchain-enhanced supply chains

Autonomous Robotics Systems and DAOs via:

1. Decentralized Autonomous Organizations (DAOs) for Robotics Fleets
2. Governance and community-led development

Digital identity and authentication which is by:

1. Decentralized Identities (DIDs) for robots
2. Secure interaction in IoT and IIoT

Real-World Asset Tokenization by:

1. Tokenized ownership of robotic assets
2. Revenue-sharing models

However, with the significant potentials to be provided by the integration of Web3 in robotics and RPA, there are challenges to overcome, such as:

1. Scalability
2. Regulation compliance, and
3. Energy efficiency



*Metaverse and Web 3.0*: The metaverse and Web3 are not mutually exclusive, but web3 technology can enhance metaverse experience. The term “metaverse” refers to virtual worlds which enable online social interaction, socialize, and engage in various activities often by using digital avatars. These digital environments sometimes incorporate virtual reality (VR) or augmented reality (AR) technology to create immersive and realistic digital experiences [23].

## CONCLUSION

Web 3.0 is still in its early stages of development but has the potentials to revolutionize the way we interact with the internet. It will create a more equitable and inclusive online world by giving users more control over their data and privacy. The web3 applications in the short term will become more user-friendly, be more accessible to a broader audience, and see more and more best web3 websites emerge that will take advantage of the unique features of web 3.0 such as decentralization and blockchain technology. Web 3.0 in the long term can transform many aspects of our lives, from how we work and learn to how we interact with government and businesses. In order not to lag behind, now is the time to be involved and key-in into the Web 3.0 revolution, as even many new and innovative web3 projects in the future will still emerge.

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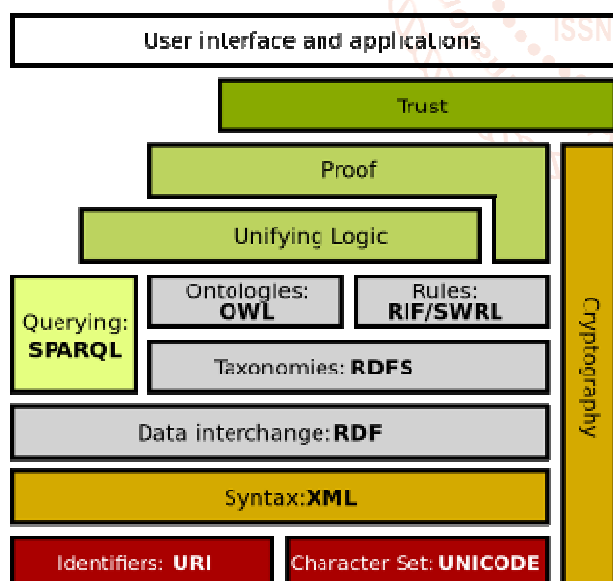
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**Figure 1. Web3 Final.jpg**

Source:[https://www.google.com/search?sca\\_esv=d492661d9463033a&sxsrf=AHTn8zr8nJLUhQRklGoHSI1\\_RoPveVxOw:1741354531835&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT\\_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv\\_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwje5rCSi\\_iLAXVZQkEAHRtPJ3oQtKgLegQIDxAB&biw=1036&bih=539&dpr=1#vhid=U6JYLwdWIC8t9M&vssid=mosaic](https://www.google.com/search?sca_esv=d492661d9463033a&sxsrf=AHTn8zr8nJLUhQRklGoHSI1_RoPveVxOw:1741354531835&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwje5rCSi_iLAXVZQkEAHRtPJ3oQtKgLegQIDxAB&biw=1036&bih=539&dpr=1#vhid=U6JYLwdWIC8t9M&vssid=mosaic)



**Figure 2. Web 3.0.png**

Source:[https://www.google.com/search?sca\\_esv=d492661d9463033a&sxsrf=AHTn8zr8nJLUhQRklGoHSI1\\_RoPveVxOw:1741354531835&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT\\_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv\\_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwje5rCSi\\_iLAXVZQkEAHRtPJ3oQtKgLegQIDxAB&biw=1036&bih=539&dpr=1#vhid=U6JYLwdWIC8t9M&vssid=mosaic](https://www.google.com/search?sca_esv=d492661d9463033a&sxsrf=AHTn8zr8nJLUhQRklGoHSI1_RoPveVxOw:1741354531835&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwje5rCSi_iLAXVZQkEAHRtPJ3oQtKgLegQIDxAB&biw=1036&bih=539&dpr=1#vhid=U6JYLwdWIC8t9M&vssid=mosaic)

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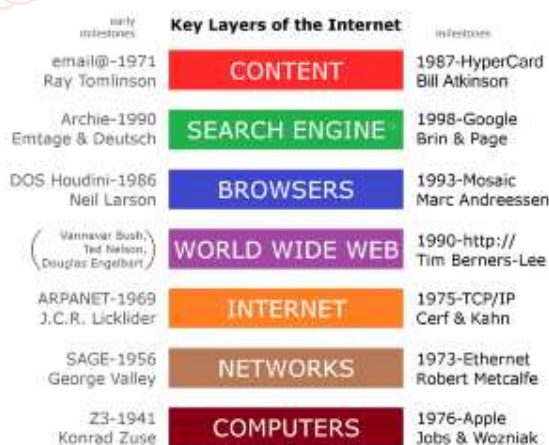
**Figure 3. Semantic Web**

Source:[https://www.google.com/search?sca\\_esv=98308951ba5df8a8&sxsrf=AHTn8zr2cMOzam2hMWtFAlaeNWxm6zOMw:1741322428586&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT\\_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv\\_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwjsia7Gk\\_eLAXUbXUEAHRdpNBwQtKgLegQIExAB&biw=1036&bih=539#vhid=PB9G6rBd527qM&vssid=mosaic](https://www.google.com/search?sca_esv=98308951ba5df8a8&sxsrf=AHTn8zr2cMOzam2hMWtFAlaeNWxm6zOMw:1741322428586&q=images+on+web+3.0+by+wikipedia&udm=2&fbs=ABzOT_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk7XZXfnfKsaRZouQANLhmpfhfaRIDNPoWc6rCumaYm3VojqsiuBofLuYVqeJuzeVFrArtYn8anrtQg9oucHCeTR27yMHxAF31k9lv_a8NXq9Jk1mNfGFUy8ZFut1MXrV1vBhNe7WnE43Sd7e7305krgzHUJQw&sa=X&ved=2ahUKEwjsia7Gk_eLAXUbXUEAHRdpNBwQtKgLegQIExAB&biw=1036&bih=539#vhid=PB9G6rBd527qM&vssid=mosaic)



**Figure 4. Twitter**

Source:<https://en.wikipedia.org/wiki/Twitter>



**Figure 5. Internet Key Layers.png**

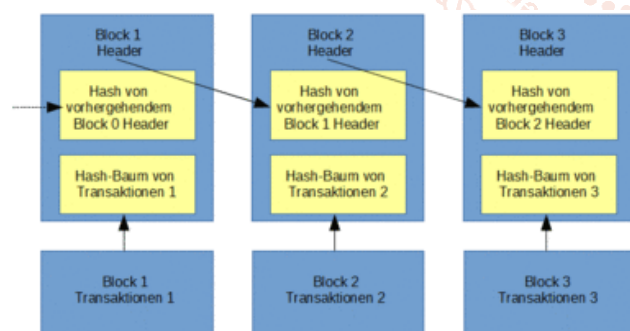
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d=wphG1uaDNphVVM&vssid=mosaic



**Figure 6. User-generated content**

Source:[https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca\\_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8\\_Bva2ejW4w%3A1741356821675&ei=Ff\\_KZ8fKOG0hblPpcGemAc&ved=0ahUKEwiH3aHWk\\_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs\\_l=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbnNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGhhSABQAFgAcAB4AJABAJgBAKABAKoBALgBDMgBAJgCAKACAJgDAJIHAKAHAA&scient=46Wpj13r6XL\\_sM&vssid=mosaic](https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8_Bva2ejW4w%3A1741356821675&ei=Ff_KZ8fKOG0hblPpcGemAc&ved=0ahUKEwiH3aHWk_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs_l=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbnNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGhhSABQAFgAcAB4AJABAJgBAKABAKoBALgBDMgBAJgCAKACAJgDAJIHAKAHAA&scient=46Wpj13r6XL_sM&vssid=mosaic)



**Figure 7. Blockchain**

Source:[https://www.google.com/search?q=images+of+blockchain+architecture+by+wikipedia&sca\\_esv=40d5efbb99244e37&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrOXveyPipd1ONxP61\\_Ny7CvJK8TA%3A1741405235220&ei=M7zLZCUDbSxhbIPxMqp6A4&ved=0ahUKEwigtGDyPmLAXW0WEAHURICu0Q4dUDCBQ&oq=images+of+blockchain+architecture+by+wikipedia&gs\\_l=EgNpbWciPmltYWdlcyBvZiBibG9ja2NoYWluIGFyY2hpdGVjdHVyZSBieSB3aWtpcGVkaWFihrQCUMoMWp7vAXABeACQAQGYAcAdoAGXOqoBCzAuMTguMTMuMi4xuAEMyAEAAEBmAIBoAISwgIH](https://www.google.com/search?q=images+of+blockchain+architecture+by+wikipedia&sca_esv=40d5efbb99244e37&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrOXveyPipd1ONxP61_Ny7CvJK8TA%3A1741405235220&ei=M7zLZCUDbSxhbIPxMqp6A4&ved=0ahUKEwigtGDyPmLAXW0WEAHURICu0Q4dUDCBQ&oq=images+of+blockchain+architecture+by+wikipedia&gs_l=EgNpbWciPmltYWdlcyBvZiBibG9ja2NoYWluIGFyY2hpdGVjdHVyZSBieSB3aWtpcGVkaWFihrQCUMoMWp7vAXABeACQAQGYAcAdoAGXOqoBCzAuMTguMTMuMi4xuAEMyAEAAEBmAIBoAISwgIH)

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mg#vhid=RNG5XRV-PsLXMM&vssid=mosaic



**Figure 8. Web 2.0**

Source:[https://www.google.com/search?sca\\_esv=ce548a25f26ba467&sxsrf=AHTn8zrmBF0oO3jx3bx4BPMbnb6sDSSoDg:1741356484757&q=images+on+web+2.0+by+wikipedia&udm=2&fbs=ABzOT\\_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk5gux0mYvyWoCy003vfIOilfPuQV3MejCj8\\_w2KjsV6xZaAXLiNrvMFZG1bvzjZVlyxqLMxe\\_df3gXtNJDJ4YqZU9XETRisZ97sYMbb2bljbSSJYK6hgPwHmGfe3aeYwdB4VO2r\\_gcGjnBbwvx1T45NwaeKA&sa=X&ved=2ahUKEwjY3821kviLAXVMV0EAHZTcAoIQtkgLegQIERAB&cshid=1741356487285563&biw=1036&bih=539&dpr=1#vhid=B8Pqmqz2pR6KWUM&vssid=mosaic](https://www.google.com/search?sca_esv=ce548a25f26ba467&sxsrf=AHTn8zrmBF0oO3jx3bx4BPMbnb6sDSSoDg:1741356484757&q=images+on+web+2.0+by+wikipedia&udm=2&fbs=ABzOT_CWdhQLP1FcmU5B0fn3xuWpAdk4wpBWOGsoR7DG5zJBkzPWUS0OtApXR2914vrjk5gux0mYvyWoCy003vfIOilfPuQV3MejCj8_w2KjsV6xZaAXLiNrvMFZG1bvzjZVlyxqLMxe_df3gXtNJDJ4YqZU9XETRisZ97sYMbb2bljbSSJYK6hgPwHmGfe3aeYwdB4VO2r_gcGjnBbwvx1T45NwaeKA&sa=X&ved=2ahUKEwjY3821kviLAXVMV0EAHZTcAoIQtkgLegQIERAB&cshid=1741356487285563&biw=1036&bih=539&dpr=1#vhid=B8Pqmqz2pR6KWUM&vssid=mosaic)

English (en)

Komputeke

The Universal Computer Terminology Collection

Search

Welcome!

Komputeke (Esperanto abbreviation of Computer Terminology Collection or "Prikomputila terminokolekto") is an internet project of the international association [Egi](#). The project aims to list computer words in as many languages as possible, in order to stimulate the usage of correctly translated terms. Too often computer terms are not translated correctly, because translators don't have access to free professional online dictionaries. We want to offer the possibility to not only find the words, but we list as many resources as possible (with a link to it, if available) and also provide alternative translations.

At this time (November 2015), we have collected about 9000 computer related terms, 8900 of which have been translated into Esperanto, 5100 into Dutch, 3600 into German and 3900 into French.

**Wikipedia**

There is a [wikipedia article](#) about the Komputeke project. You can read there about the development, the usage and the book versions.

**Where to buy book versions?**

The 2012 edition of the book can be bought from the two leading Esperanto bookshops. Both have a traditional and an online store.

- Universala Esperanto Ligo
- Flandra Esperanto-Ligo

**Useful**

Download lists of the most common computer words in 5 languages (PDF):

- eo-en-fr-es
- en-fr-es-es
- nl-en-fr-es-es

**Conversion tool** to easily convert texts written in surrogate alphabets towards unicode text (\*kapelitaj literoj\*)

How to type Esperanto Characters like ĉ, ĝ and ŝ?

- The [New Zealand Esperanto Association](#) has compiled a handy list of Esperanto keyboards for a wide variety of modern systems.
- [Bibo](#) is my favourite Esperanto keyboard for Windows.

**Background information**

Database last updated on: 09/11/2015  
Website last modified on: 06/08/2015  
[List of new and changed terms](#) version 2012  
[List of new and changed terms](#) version 2014

**Your additions and comments**

Please use [this form](#) to get in touch with us.

Yves Nevelsteen

En Komputeke Terminokolekto

**Figure 9. Web 1.0**

Source:[https://www.google.com/search?q=images+on+web+1.0+by+wikipedia&sca\\_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrUeKi1Fq0Cr\\_M1yNwyhc9Muvq5KA%3A1741356492866&ei=zP3KZ5HRNNC6hblP0PiQ8A8&ved=0ahUKEwiR57y5kviLAXVQXUEAHVA8BP4Q4dUDCBE&oq=images+on+web+1.0+by+wikipe](https://www.google.com/search?q=images+on+web+1.0+by+wikipedia&sca_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrUeKi1Fq0Cr_M1yNwyhc9Muvq5KA%3A1741356492866&ei=zP3KZ5HRNNC6hblP0PiQ8A8&ved=0ahUKEwiR57y5kviLAXVQXUEAHVA8BP4Q4dUDCBE&oq=images+on+web+1.0+by+wikipe)



dia&gs\_lp=EgNpbWciHmItYWdlcyBvbiB3ZWlGMS4wIGJ5IHdpa2lwZWVpYUjLL1CpBliLDnABeACQAQCYAdMB0AGbA6oBAzItMrgBDMgBAPgBAZgCAKACAJgDAIgGAZIHAKAHWg&sclient=img#vhid=He-3vW6UUhmX3M&vssid=mosaic



**Figure 10. Social media**

Source:[https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca\\_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8\\_Bva2ejW4w%3A1741356821675&ei=Ff\\_KZ8fKOG0hbIPpcGemAc&ved=0ahUKEwiH3aHWk\\_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs\\_lp=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbmNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGllhSABQAFgAcAB4AJABAJgBAKABAKoBALg](https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8_Bva2ejW4w%3A1741356821675&ei=Ff_KZ8fKOG0hbIPpcGemAc&ved=0ahUKEwiH3aHWk_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs_lp=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbmNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGllhSABQAFgAcAB4AJABAJgBAKABAKoBALg)

BDMgBAJgCAKACAJgDAJIHAKAHAA&sclient=img#vhid=YbI-B8CpWGDGfM&vssid=mosaic



**Figure 11. ChatGPT**

Source:[https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca\\_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8\\_Bva2ejW4w%3A1741356821675&ei=Ff\\_KZ8fKOG0hbIPpcGemAc&ved=0ahUKEwiH3aHWk\\_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs\\_lp=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbmNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGllhSABQAFgAcAB4AJABAJgBAKABAKoBALgBDMgBAJgCAKACAJgDAJIHAKAHAA&sclient=img#vhid=emdo\\_EWia6Y9nM&vssid=mosaic](https://www.google.com/search?q=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&sca_esv=ce548a25f26ba467&udm=2&biw=1036&bih=539&sxsrf=AHTn8zrcsgeT3iX5MGw7tuN8_Bva2ejW4w%3A1741356821675&ei=Ff_KZ8fKOG0hbIPpcGemAc&ved=0ahUKEwiH3aHWk_iLAXVhWkEAHaWgB3MQ4dUDCBE&oq=images+on+difference+between++web+2.0+and+web+3.0+by+wikipedia&gs_lp=EgNpbWciPmltYWdlcyBvbiBkaWZmZXJlbmNIIGJldHdlZW4gIHdIYiAyLjAgYW5kIHdlYiAzLjAgYnkgd2lraXBIZGllhSABQAFgAcAB4AJABAJgBAKABAKoBALgBDMgBAJgCAKACAJgDAJIHAKAHAA&sclient=img#vhid=emdo_EWia6Y9nM&vssid=mosaic)